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Hypnaceae, where several species may be mingled in the same tuft, by far greater care is to be used than in the case of say *Mnium hornum*, which is usually found in pure tufts.

Under all circumstances, the members of the Sullivant Moss Chapter should take especial pains in the matter of the specimens offered by them for distribution. First, be sure the specimens sent out are real duplicates, not a lumping of two or three different collections which you "guess" are the same. Secondly, when having specimens determined by another, send large quantities; if you are not familiar with the species send *all* the material you propose to use in the distribution. Thirdly, be scrupulously exact in citing the authority for the determination; don't endanger another's reputation by your own carelessness. Washington, D. C.

ENCALYPTA PROCERA BRUCH.

E. J. Hill.

The finding of a sterile Encalypta on rocks at Lockport, Ill., in 1904, led to a correspondence with Mrs. E. G. Britton regarding its specific character In 1889 I had collected *E. procera* in fruit on Presque Isle, Marquette, Mich The question arose whether this might not be *E. streptocarpa* Hedw. (*E. contorta* (Wulf.) Lindb. as now called from an older specific name), or some other member of the genus. The specimens from Presque Isle consisted of one fruiting and a few sterile stems found in a tuft of *Distichium capillaceum*. The peristome of the capsule was unfortunately injured while examining it, but enough remained combined with other characters to lead to its identification as stated. A recent comparison with the barren stems of *E. procera* from British Columbia and fruiting plants of *E. contorta* from two stations in Europe sent by Mrs. Britton, which have a different capsule, strengthened this conclusion. A further search led to the detection of antheridia on the stem of the fruiting specimen showing that it is monoecious as is the case with *E. procera*. The Distichium with which it grew was abundantly fruiting, some barren stems of *Myurella Caryana* were also in the tuft.

The specimens from Lockport being sterile, the vegetative character can only be used to determine the species. Comparing the leaves the same type is seen in the plants from the three American localities. The leaf of *E. contorta* is longer and relatively narrower than in *E. procera* which is broader towards the top, more decidedly lingulate, sometimes subspatulate. The costa of the latter usually ceases further from the apex. The cells of the basal hyaline part are larger especially near the costa than those of *E. contorta* and at times approach a square form. The leaf characters of the two are well shown in the figure in Roth's Europäischen Laubmoose Taf. XLI. From the evidence the specimens best agree with *E. procera*.

The stems of these mosses are well provided with propagula. It was noticed at the time of identifying the plants from Presque Isle, and a reference in a note under *E. procera* in Schimper's Syn. Mus. Eur. states that simple and branching filaments resembling prothallia occur in the axils of the leaves. These structures are fully treated by Correns (Vermehrung der Laubmoose, p. 97–101: 1899.) mostly under *E. contorta* as those of *E. procera* are essentially the same. Comparing three collections made at Lockport, August and November, 1904, and June, 1905, I find them most abundant on the November plants, least on the June, seeming to increase as the season of growth advances, and as Correns states, ripening in the fall. They are mostly found above the middle of the stem, but not quite to the top in the freshly growing part. They are generally branched or forked, single or in tufts, the lower part smooth, brown or chestnut, divided by rather distant oblique partitions, the upper or propagative part comprising the brood-body chlorophyllose, papillose, the partitions vertical to the outer wall. The partitions plainly show that they are transformed rhizoids though short simple ones may be chlorophyllose almost from their origin, the brown portion very slight. They spring from the stem and the basal part of the costa. None have been observed on the lamina. The cells of the papillose part are mostly longer than wide commonly 25μ long by 22–30μ in diameter, but varying between 20–80 x 20–55μ. Rhizoids which function as such may sparingly branch from the propagula but are much smaller, 5–6μ in diameter.

In *E. contorta* as described by Correns, the propagula are produced only on the stem. His efforts to produce them on the leaves by cultivation met with little success, a few threads being sometimes developed on the sheathing base of young leaves, but none on the lamina. When considering *E. procera* he quotes Berggren to the effect that portions of the leaves of this species "readily develope protonema when brought into favorable positions." He concludes with the statement that "of these two nearly related species the monoecious (*E. procera*) is better provided for asexual multiplication than the dioicous (*E. contorta.*)" This seems to be borne out by the specimens from Lockport as the propagula are not confined to the stem as in *E. contorta.*

The moss on Presque Isle was found in fissures on the north face of a cliff or wall of magnesian rock, a dolomite in composition. Those at Lockport grow on the east face of a low cliff of magnesian linestone, dolomitic in character. A little cushion was found in a shallow depression of the vertical face at the base of a tuft of *Pellaea atropurpurea*, another on the edge of the cliff where some soil had accumulated and was associated with *Reboulia hemispherica*: a considerably larger tuft on a narrow ledge with a thin soil mixed with *Brachythecium acuminatum rupincolum.* These plants like the mosses at Presque Isle show the general character of its associates. The habitat is shady but not moist or only slightly so, more commonly dry. Roth gives the habitat of *E. procera* as "shaded schistose rocks." It is usually mentioned as growing in moist places as well as *Myurella Caryana* and *Distichium capillaceum.* But the latter occurs in dry situations also. The associates at Lockport are in general xerophytes, though both Reboulia and the Brachythecium likewise occur as mesophytes.

The discovery of *E. procera* at the two places, Presque Isle and Lockport, south of their usual range, is at first view a little surprising. On the

Eastern Continent it is found in high latitudes, Brotherus (Die Natürlischen Pflanzenfamilien, 1, 3:438, 1902) gives its range as Norway, North Finland and Lapland, Beeven Island and Spitzbergen, also Siberia, near the mouth of the Yenisei River. Several of these stations are north of the Arctic Circle. It appears on the Western Hemisphere within the Arctic Circle at Clavering Island off the coast of Greenland and nearest the two above mentioned island stations north of Europe. On the mainland it has been mostly found in the western part of British America. Macoun gives as its range "Rocks and banks amongst the Rocky Mountains, *Drummond.* Crevices of rocks, Ont.; on wet rocks near Hector and at the 'Gap,' Rocky Mountains; also on the bank of the Columbia River at Revelstoke, B. C., 1890, *Macoun.*" (Catalogue of Canadian Plants, Musci, p. 96, 1892.) It was the moss from Hector, B. C., that I had for comparison (Can. Mus. No. 365). If we follow Brotherus in identifying *E. Selwini* Aust. as *E. procera* Bruch, then Vancouver Island (Victoria at the south end) and some more northerly stations will be included. The station in the above range nearest to Presque Isle is Lake Nepigon, north of Lake Superior, about two hundred and fifty miles away. Its presence on the south shore of Lake Superior would be natural enough in a climate more severe than parts of British Columbia and especially Vancouver Island. It is harder to account for it in northern Illinois, but it is only one of a number of northern plants that find a congenial home near the south end of Lake Michigan. It is the southern limit of range for *Pinus divaricata*, the Jack Pine. Other plants of the vicinity are *Linnaea borealis*, *Betula papyrifera*, *Salix adenophylla*, *Equisetum scirpoides*, *Aster ptarmicoides lutescens.*

A factor of great weight in accounting for the southern distribution of boreal plants is their relation to former lines of drainage. The locality at Lockport is on the outlet of Lake Michigan where its water, together with those of the upper Lakes, went southward to the Mississippi. It is a glacial made valley through which now flows a small river, the Desplaines. The cliff is vertical, the base covered by thallus, the top forty or more feet higher than the glaciated rock-bed of the valley. Except by the slow process of weathering to which the plants readily conform, the upper part of such a mass would be unchanged since the ice-sheet left it. The lower part would be subject to the wear of the water of the outlet. That plants migrate from the north during the cold of the ice-age is now a common concession. That they withdraw as the ice receded is equally granted, such being left as could adjust themselves to changed climatic conditions. There is no objection, based on climate, to the presence of plants in northern Illinois that are found on the south shore of Lake Superior or in the parts of British Columbia and Vancouver Island near the Pacific Coast, and there is little probability that a moss sheltered as on the rocks at Lockport once established, would be subject to extinction by violence. There is no evidence to show that they were liable to overflow by the former outlet of the lakes. As now constituted there is a valley cut in the limestone at this point forty feet deep and a mile and a quarter wide. Only a very narrow part of it has been deepened by the river that now occupies it, whose shallow bed is but a few feet below the bed of the ancient river, a flat rock bottom covered by a few inches of soil.

Chicago, Ill.

LICHEN NOTES—No. 1.

G. K. Merrill.

Since the publication of Prof. Fink's paper on *Cladonia verticillata* Hoffm. (Bryologist, **7**:6, 1904) several correspondents have enquired concerning the validity of *C. gracilis* (L.) Nyl. var. *verticillata* Fr. as the name given to plants of similar appearance in their herbaria. To these we will say: the nominations are equivalent and stand for identical forms.

The synonymy of the plant is a varied one. Called by Hoffman (Deutsch. Fl. (1796) p. 122) *C. pyxidata*, **C. verlicillata*, that name is retained in the works of Floerke, Schaerer, Babington, Coemans, Wainio and others, all of whom concede to it specific rank. Elias Fries (Lich. Eur. Ref. (1831) p 219) was first to correlate the plant with *C. gracilis*, and it is only natural that our own Tuckerman, pupil of the great master, and throughout life dominated by his teachings, should take the same ground. Such a view is not difficult, as all field workers will agree. We often find undoubted *C. gracilis* proliferous from the center of scyphi, and again verifiable *C. verticillata* with elongated podetia and narrowed cups or rarely ascyphiferous forms with subulate terminations. In our copy of Macoun's Canadian Lichens, No. 295, this condition of *verticillata* is beautifully exemplified and furnishes a remarkable exhibit of transitional tendencies. Nevertheless *C. verticillata* is sufficiently differentiated from *C. gracilis* when examined in typical specimens to be considered distinct. The connecting forms are of no more importance than those serving to link other species in the polymorphous potpourri of the Cladoniaea.

The chemical test with KHO seems to be without particular value in this group. Wainio states that there is no reaction in *C. verticillata*, and in *C. gracilis* there may or may not be. Leighton declares that no reaction is noted with either, while Parrique finds none with *C. gracillis chordalis*, doubtful results with *C. gracilis elongata* and none with *C. verticillata* with the exception of varieties *subcervicornis* Wainio and *Krempelhuberi* Wainio, both of which owe their separation to this feature.

Wainio subdivides the verticillata group into three varieties with several forms and modifications. Comprehending within the meaning of the term variety those forms of closest adherence to the type (varietas constantior=v.), he uses the word form to define phases of perverse development, not self determinative (forma autogenetica inconstans=f.) and modification is applied to anamorphic conditions produced through peculiarities of environment (modificatio inconstans statione producta=m.)

Our continental North American representatives so far known are:

C. verticillata Hoffm. v. evoluta Th. Fr.
v. evoluta m. phyllocephala Flot.

ERRATA

Page 1, line 13 from bottom, for *Sullivantae* read *Sullivantiae.*

Page 2, line 18 from bottom, for Europeae read Europaea.

Page 3, line 10 from bottom, for Europea read Europaea.

Page 6, line 15, for ONITHOPODIOIDES read ORNITHOPODIOIDES.

Page 7, line 21, for INTEGROFOLIA read INTEGRIFOLIA.

Page 25, line 12, for iodine read iodide

Page 43, line 7 from bottom, for Sphaerocaphalus read Sphaerocephalus.

Page 51, line 22, for saxitalis read saxatilis.

Page 53, line 15, for *endivaefolia* read *endiviaefolia.*

Page 53, line 18, for *Lyelii* read *Lyellii.*

Page 54, line 11, for *leavis* read *lævis.*

Page 57, line 3 of Explanation of Plate V, for *asplenoides* read *asplenioides.*

Page 71, line 2, for **M. C.** read **C. M.**

Page 80, line 10, for **n. sp.** read **nom. nov.**

Page 94, line 8 from bottom, for *cylindrothecium* read *cladorrhizans.*

Page 102, line 8 of key, insert b before Ap. scarlet or orange.

Page 102, last line, for *Everina* read *Evernia.*

Page 103, line 3, for *Everina* read *Evernia.*

Page 103, line 15, for fibrilose read fibrillose.

Page 104, line 18, for filbrillose read fibrillose.

Page 106, line 5, for verraculose read verruculose.

Page 109, line 16 from bottom, for thallus read talus.

Page 112, line 12, for Floerk's read Floerke's.